



Case Finland & the best practices of commercializing nanotechnology in EU

Dr.Sc. (Tech.) Eeva Viinikka, Business Director
Programme Director of National Nanotechnology Cluster Programme
Culminatum Innovation Ltd Oy
www.nanobusiness.fi



CASE FINLAND: the hub for innovations

The best country in the world (Newsweek 2010)

2nd within the world's innovation hot spots (Harvard Business Rev. 2009)

1st in fraction of researchers in the population (OECD 2006)

The most competitive nation (IMD, Harvard)

One of the least corrupt (Transparency Intl.)

One of the best public education system (OECD)

One of the best in penetration of mobile and Internet

Finland is an effectively networked club of 5,3 million

Open for international collaboration





Finnish nanotechnology today

- 100 companies with commercial product, 200 in pre commercial phase
- 170 research groups – 9 universities, 5 public research organisations
- Sector size 12/2008 >300 MEur, 60% exports, 3000 professionals
- Core in chemicals and materials





Spearheading nanotechnology in Finland



High class research & business

- Nanomaterials – the strongest industrial nano group
- Nanosurfaces (www.nanosurfaces.fi)
- Photonics (www.orc.fi)
- Aerosols (www.fineparticleforum.fi)
- Microtechnology and MEMS
- Diagnostics, pharmaceuticals, medical

High class research, to be commercialized

- Nanoelectronics
- Nanocellulose
- Printed Intelligence (www.printocent.fi)
- Safety and metrology
- Modelling and characterization

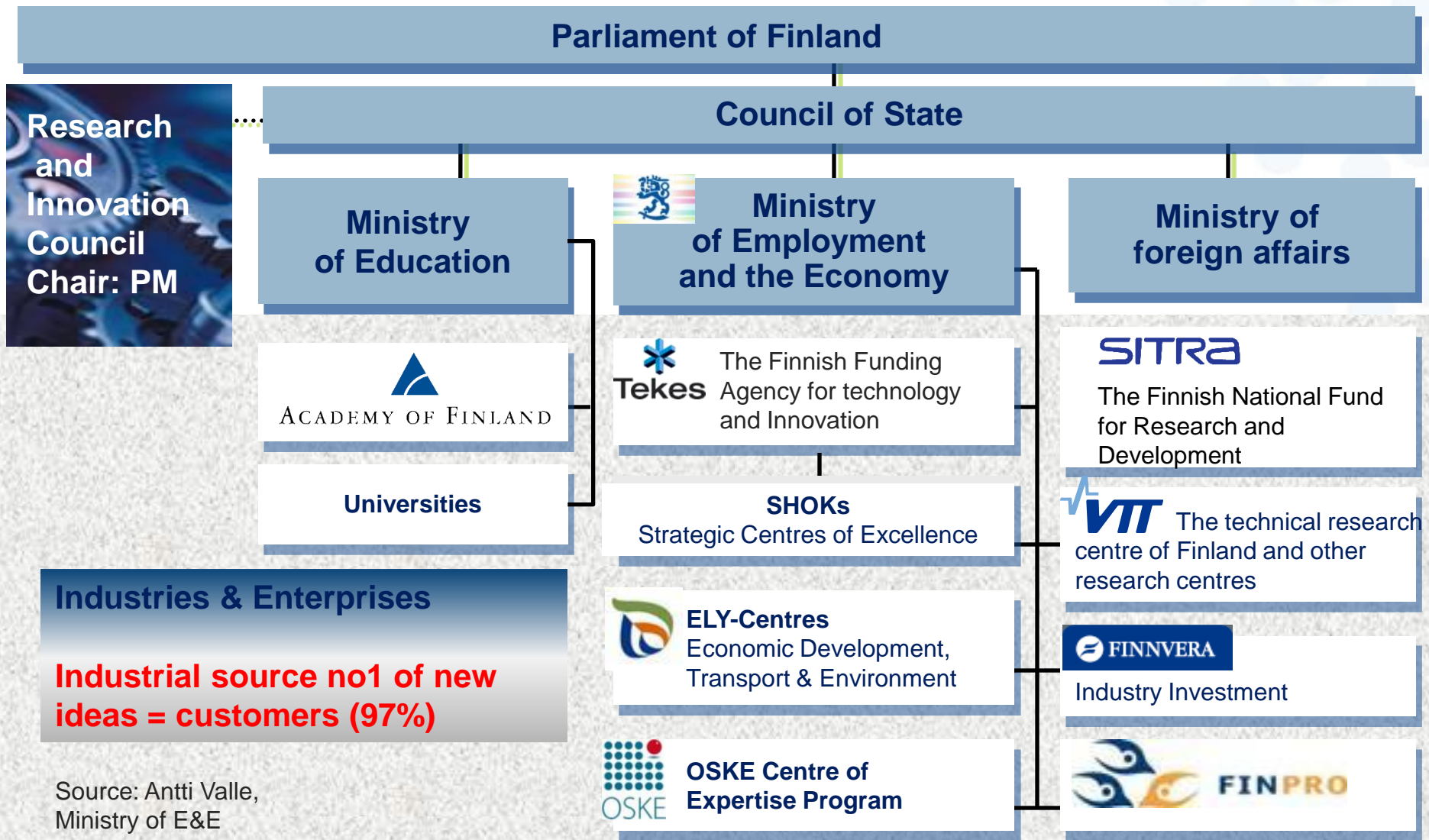


Nanotrends in Finland follow EU trends

- **Hype Curve**
 - Now facing industrialization phase
- **Research funding**
 - Focus from technology development to applications
- **Nanocompanies business skills improved**
 - Marketing communications from tech to applied value
- **Environmental, health and safety issues!**



Finnish innovation environment = public-private partnership



Nanotechnology cluster programme – the gateway to Finnish nanotech expertise

Ministry of Employment and Economy, 2007-13

Fostering the growth of Finnish nanotech based business and implementation of nanotechnology in Finnish industry

Services to Finnish Companies

Promotions

Partnering, Projects, Business skills

Resources:

8 Centres of Expertise + Coordination

2 MEur Annually + projects

Internationally

Finnish partners to US projects

Finnish nanotech to US market



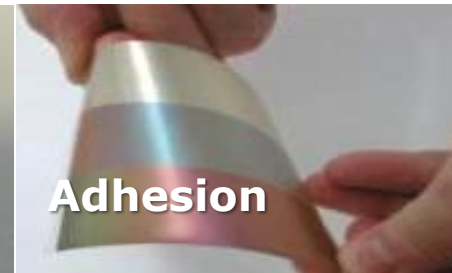
Nanocluster team reaches >90% of all Finnish nano and micro activities and stakeholders



The added value of nanotechnology?

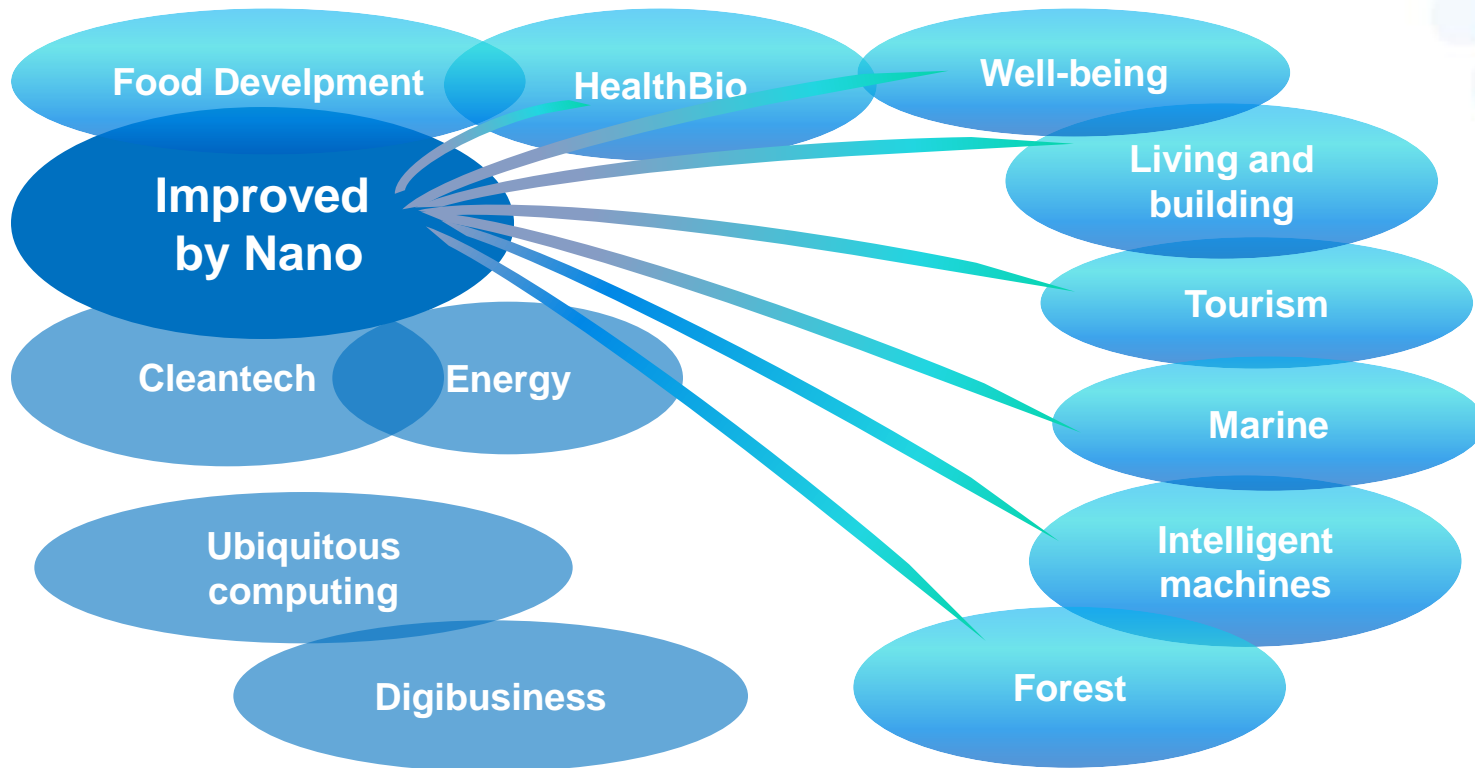
Improved properties in existing products, typically

- Coatings – wear resistance, anti dirt, sticking, etc
- Particles – new properties in oil, paints, lubricants, etc additives
- Composites – the same structure but lighter and stiffer
- Electronics and sensors – a lot of nano inside
- Consumer - glass, plastics, foils, sports equipment





Promoting nanotech companies in collaboration with customer clusters



BOOSTING INNOVATION IS NO RANDOM WALK OR A BUNCH OF LUCKY COINCIDENCES, IT IS ABOUT SYSTEMATIC WORK



Nanotechnology in industrial applications

Collaboration with Intelligent Machinery and Marine Clusters

- Marketing seminars
 - speakers: nanotech companies invited by Nanocluster
 - audience: invited by the customer cluster
 - tailored marketing material: your nano now and in 5-10 years
 - partnering event, small scale exhibition
- Roundtable: companies & scientists & end users

Nano SME:s into new value chains: new business
Renewal and added value to the customer sector

FINNISH success stories in ALD:  **BENEQ**  **Picosun**



Nano in built environments

Collaboration with Living, Well-being and Tourism Clusters

○ **Piloting environments:**

1st reference, showroom, door opener to new customer segment, new business, new products

- Finnish Hotel of Tomorrow FHOT 2008
 - Finnish Housing Fair 2009, 2011
 - City of Helsinki's new elderly care centre
- ### ○ Nano products promoted
- anti dirt coatings for kitchen & bathroom
 - decorative glass tiles, glass walls, lightning
 - anti moisture and anti dirt textiles
 - indoor air purification systems
 - sound showed technology





Example microcluster: Fine Particle Forum

FINE PARTICLE FORUM

Independent and neutral network of 101 aerosol stakeholders:

– companies (70%), research organisations, publicly funded organisations, ministries, funding, NGOs, unions, etc.

- ☐ Active networking, tailored partnering – interdisciplinarily
- ☐ Promoting the **internationally very competent know-how** in aerosols!
- ☐ Gathering and delivering information
- ☐ Open innovation
- ☐ Autumn seminar, mini seminars
- ☐ FAST P2P for companies
- ☐ Web pages www.fineparticleforum.com
- ☐ newsletters





The innovation toolkit to commercialize academic know-how

- Promote the sources of new know-how
 - Recognize, document, interpret, disseminate
- Educate to commercialize
 - Enlarge the scientists' skill sets
- Encourage to commercialize
 - Prizes, honour, publicity, prospects
- Promote the new business
 - Look for and provide opportunities
- Support growth
 - Know the success factors
 - Educate in business skills
 - Nourish continuous renewal





NanoCom, an FP7 project bridging the gap between lab and industry

- Best practices in commercialization: identifying, promoting
- Barriers of commercialization: identifying, new ways to lower
- Open innovation: new, nanotech specific approach
- Road mapping, policy and investment advise

Partners:

University of Nottingham (lead partner), CEA LITEN, Fraunhofer Gesellschaft, Karlsruhe Institute of Technology, Centre for Process Innovation, RWTH Aachen University, Plastipolis, Innobridge, Veneto Nanotech, Bayer Technology Services, NanoTrade, Centro Ricerche Fiat, Acciona Infraestructuras, Lux Research, NineSigma, Culminatum Innovation



Questionnaire: the success indicators?

The effect of nanotech on your business?

	not relevant	low	medium	high	I don't know
○ Increase in sales revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Job creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Reduced production costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ New market entry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Increased market share in existing products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ New product launch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Improving the quality of existing products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Reduced environmental impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
○ Meeting legal requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

⇒ **average success indicator for each company**

60% of >250 companies: nanotechnology has HIGH impact in new product launch, new market entry and increase in sales revenue!



Questionnaire: success factor candidates?

Technological Domain

- Fundamental understanding
- Reproducibility
- Reliability
- Control and manipulation
- Maturity

Marketing & Strategy Domain

- Regulations
- Acceptability
- Competition
- Market opportunities
- Intellectual property

Manufacturing Domain

- Efficiency
- Commercialization delay
- Scalability
- Standards
- Costs

Organizational & Investment D.

- Collaborations
- Recruitment and critical mass
- Infrastructure
- Return on investment
- National / Regional incentives

Innovation practices within the company

- Organisation of innovation activities
- R&D project management
- Knowledge transfer and the company culture
- Evaluation processes for R&D projects

External knowledge and open innovation

- Organised absorption of external knowledge
- Organised dissemination of capabilities/ideas/innovations
- Collaboration with other companies
- Collaboration with Public research organizations

Funding policies

- Local, regional funding
- National funding
- EU funding
- Private funding (corporate, VC,...)

Societal aspects and structural interventions

- Local business support (devel. agencies, networks, clusters)
- Local technical support (incubators, R&D facilities, tech centers)
- Cultural aspects or habits
- Regulations and standardization



Respondents; who were they?

More than 250 European nanotech companies

- Mature: 40% in commercial phase, only 7% at vision stage
- Small ones dominate: 50% with 1-49 employees, 23% >1000
- Value chain evenly covered
- Europe evenly covered (top 5 Italy, Finland, Germany, Spain, Czech)

Three statistically significant company types

- A. Big corporation, nano makes only small part of the revenue, closer to R&D than commercial, lower in value chain
- B. SME, nano makes the major part of the revenue, close to or with commercial products, higher in value chain than A
- C. Like B, but nano makes only mid-sized part of the revenue

Playing with the data – numerous statistical techniques

- Regression Analysis, mean comparison test, paired sample mean comparison..



Success factors vs. barriers

Barriers need to be overcome just to survive



Success factors provide competitive advantage, once the basic needs are satisfied





Success factor no 1: Focus in business point of view

- The most important success factor topics: marketing and strategy
- Start discussion and collaboration with customers at early phase
- Study market opportunities, scalability, costs, ROI
- Take care of IPR and the team's business skills
- Consider including services in the business model

To do: Education, local business support

Success factors **focus in business** vs statistics on >250 companies

- Recognized as key success factors by the companies
- Source of competitive advance
- **Result strongly supported by 30 interviews**





Success factor no 1: Focus in business point of view

Business model	average success indicator	standard deviation	number of companies
Intermediates, Services	3,2	0,4	10
Materials, Intermediates, Products	3,1	1,0	14
Products, Services	3,1	0,8	7
Services	3,0	1,3	29
Materials, Others, Services	3,0	0,9	24
Products	2,9	1,0	44
Tools, Services	2,9	1,0	15
Materials, Intermediates	2,8	1,0	11
Tools	2,6	1,3	44
Intermediates	2,6	1,4	12
Materials	2,5	1,4	28

Average success indicator: companies estimated their success in nano projects using 7 different indicators, the results were turned in average success indicator for each company.



Success factor 2: organize your in-house innovation activities

- R&D project management is the key success factor, especially for SMEs and companies in R&D phase
- R&D project management also one of the key BARRIERS

To do: Education!



Success factor ***In-house innovation activities*** vs statistics on 278 companies

- *Significant correlation with success*
- *Source of competitive advance*
- *Recognized as success factors by companies*
- *Result supported by interviews*



Success factor no 3: Utilize local support

Local support provides you competitive advance, once the basic needs have been satisfied. Local support means

- tech support: incubators, R&D facilities, technology centers
- business support: development agencies, networks, clusters

To do: organize high quality local support and make sure all companies are aware of services and pulled in

Success factor **local support** vs statistics on >250 companies

- Significant correlation with success
- Sources for competitive advance
- Recognized as success factors by companies
- **US companies rely on strong local business support in R&D phase.**





Success factor no 4: Collaborate, utilize open innovation

- The successful ones appreciate all collaborations
- R&D phase success factors: all external knowledge, open innovation and collaborations with especially other companies!

To do: contacts, especially to customer industries

- ***Support pre-commercial phase companies in finding partners***
- ***Organize tailored promotion to selected customer industries.***

Success factor ***Collaborations*** vs statistics on >250 companies

- *Significant correlation with success*
- *Sources for competitive advance*
- *Recognized as success factors by companies*





Success factors 5-7: production, funding, handling the risks

5. Be thorough in establishing the production

- think about how to organize the production at very early phase
- competitive advance: efficiency, reliability and reproducibility

6. Take care of funding

- The more you're focused in nano, the stronger success factor VC is
- The US companies pay more attention to money!

7. Get prepared in insecurities and cultural issues

- Know as much as possible about the regulations and safety issues to minimize the effect of insecurities in business.

To do:

- ***Support the steps from proof of concept to large scale production , commercialization, process development?***
- ***Support getting seed funding and VC?***



How to learn more from US best practices... discussion & comments welcome!

[Homepage](#) [Approach](#) [Dissemination](#) [Training](#) [Diary](#) [Consortium](#) [Contact](#)



NanoCom

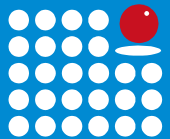
Best Practices to Lower the Barriers for
Commercialisation of Nanotechnology Research

Vision

The NanoCom coordinated action will contribute to bridging the gap between lab based and industrial applications in nanotechnology by creating a European wide approach and mechanisms for lowering the barriers and spreading best open innovation practices for rapid commercialisation and investment in innovative nanotechnology driven products.

NanoCom is funded by the EU 7th Framework Programme





Contact us:
nanocluster@culminatum.fi
www.nanobusiness.fi